“Development of an alternative method for synthesis of oxygen and nitrogen containing heterocyclic compounds: A perspective study of antiviral and antibacterial properties”

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By

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“Development of an alternative method for synthesis of oxygen and nitrogen containing heterocyclic compounds: A perspective study of antiviral and antibacterial properties”

Aim: To develop a greener alternative method for the synthesis of oxygen and nitrogen containing heterocyclic compounds: A perspective study of antiviral and antibacterial properties

Introduction: Heterocyclic compounds possess a cyclic structure with two or more different kinds of atoms in the ring. Heterocyclic chemistry is a very important branch of organic chemistry, accounting for nearly one-third of modern publications. Two-thirds of organic compounds are heterocyclic compounds. The heterocyclic compounds represent vital importance in medicinal chemistry and have a robust curiosity with a wider scope of synthesis and processing of various types of pharmacological and biological properties. The various clinical applications of heterocyclic compounds have a considerable active role as antibacterial, antiviral, antifungal, anti-inflammatory, antimycobacterial, antitubercular, antimalarial, trypnocidal, and anti-HIV agents. They also exhibit muscle relaxant, anticonvulsant, genotoxic, herbicidal, anticancer, and lipid-peroxidation inhibitor activity, as well as hypnotics, antidepressants, anthelmintic, and insecticidal agents [1-8].

The wide variety of heterocyclic compounds are known, but especially nitrogen-containing heterocyclics have great importance because of their wide applicability in the field of medicine. They are broadly distributed in nature and are essential to life, playing a vital role in the metabolism of all living cells, such as the essential amino acids like proline, histidine, purine, and pyrimidine bases of the genetic material of DNA, the vitamins, coenzymes, and many other natural products. There are vast numbers of nitrogen-containing heterocyclic building blocks that have applications in pharmaceuticals, agrochemical research, and drug discovery [9-13].

Need and significance of research work:

The heterocycles containing nitrogen and oxygen act as an important structural motif for various bioactive molecules. They have been employed in the preparation of important drugs required for the treatment of inflammation, hypertension, and HIV, and possess antibacterial, antihelmintic, antibiotic, and immunosuppressant activity. They also possess inhibitory activity against the enzyme cycloindependent kinase, antiallergies, and schizophrenia.

Survey of literature:

Heterocycles containing nitrogen and oxygen are used for medicinal purposes in the drug industry worldwide. This has attracted significant attention, highlighting the medical importance of these heterocyclic compounds.

Objective of the research work:

1. Synthesis of heterocyclic compounds like pyrazoles, oxazoles, and fused heterocycles like benzothiazoles, benzimidazoles, tetrazoles, triazoles, and their derivatives.

2. Synthesis of oxazole, chromones, and various heteroatoms containing heterocyclic analogues.

3. Utilization of modern methodologies.

Hypothesis:

Nitrogen-containing hetrocyclic compounds act as an important precursor for important drugs. Hence, the synthesis, characterization, and screening of such molecules for medicinal purposes are more valuable.

Methodology and Tools

Preparation of 5- and 6-member rings by using reported methods: condensation and cyclization with urea, thioureas, and amino compounds. Some conventional methods may be replaced by using modern methods like microwave and ultrasound irradiations.

Characterization of these compounds can be done with spectroscopic techniques like IR, NMR, MASS spectroscopy, etc.

8-SCHEME

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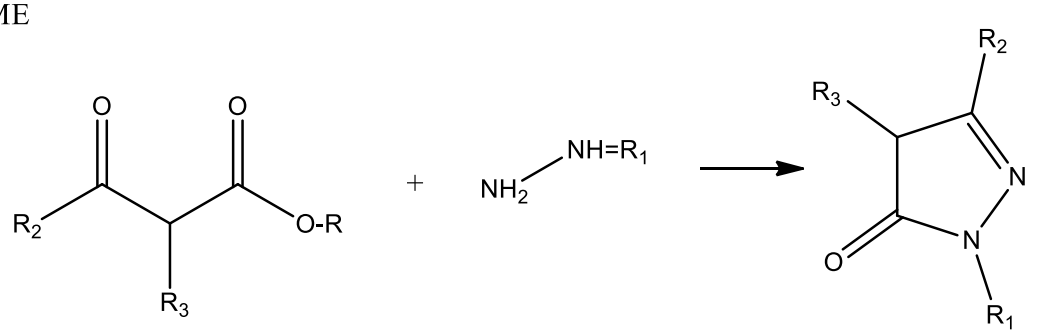

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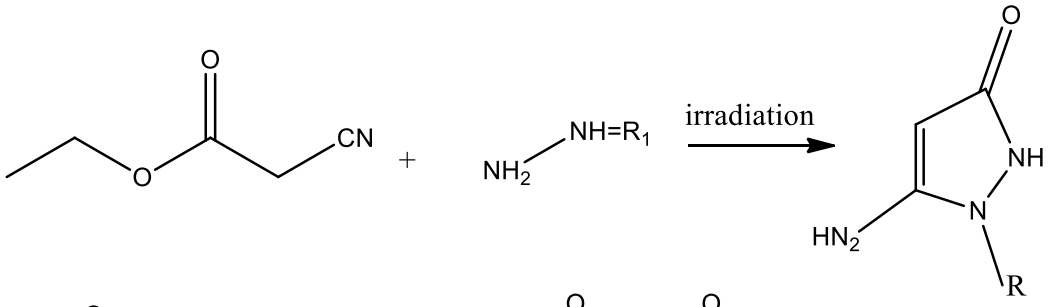

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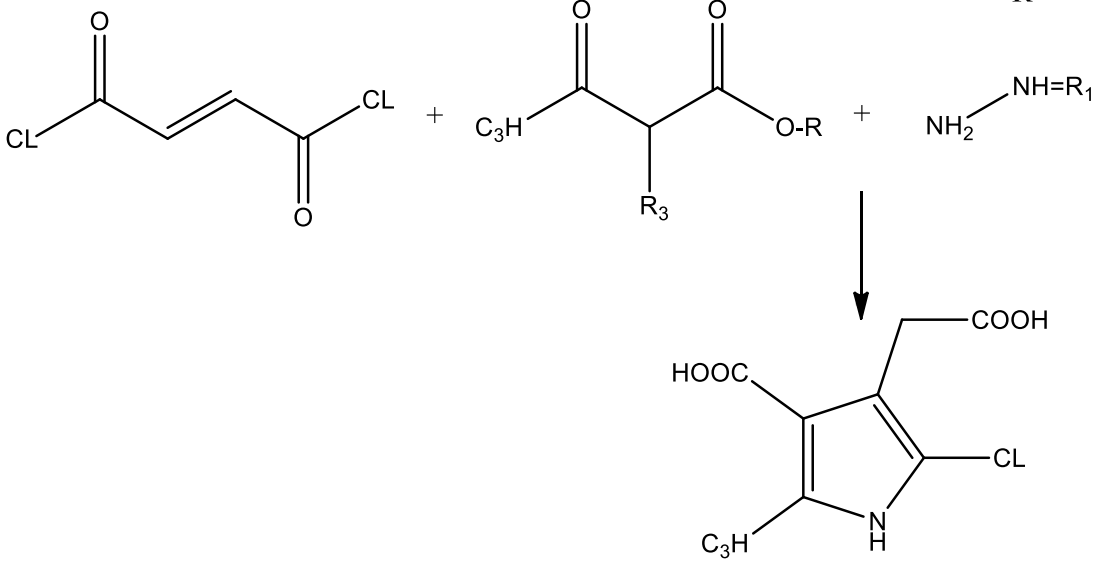

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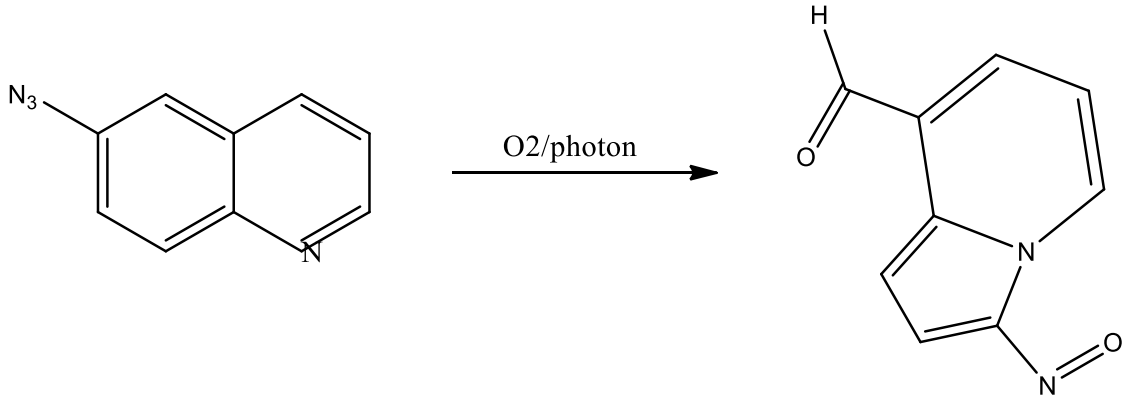

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Research Scholar **Research Guide**

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